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MAMMOTH CAVE

of

Kentucky

Published by
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1909



HOVEY'S
Practical Guide
to the
REGULATION
ROUTES



PRICE, 25 CENTS



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HOVEY'S HAND-BOOK
OF
The Mammoth Cave
OF KENTUCKY

A PRACTICAL GUIDE TO THE
REGULATION ROUTES

With Maps and Illustrations

BY
HORACE CARTER HOVEY, D. D.
F. G. S. A.

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Louisville, Kentucky
JOHN P. MORTON & COMPANY
Incorporated
1909

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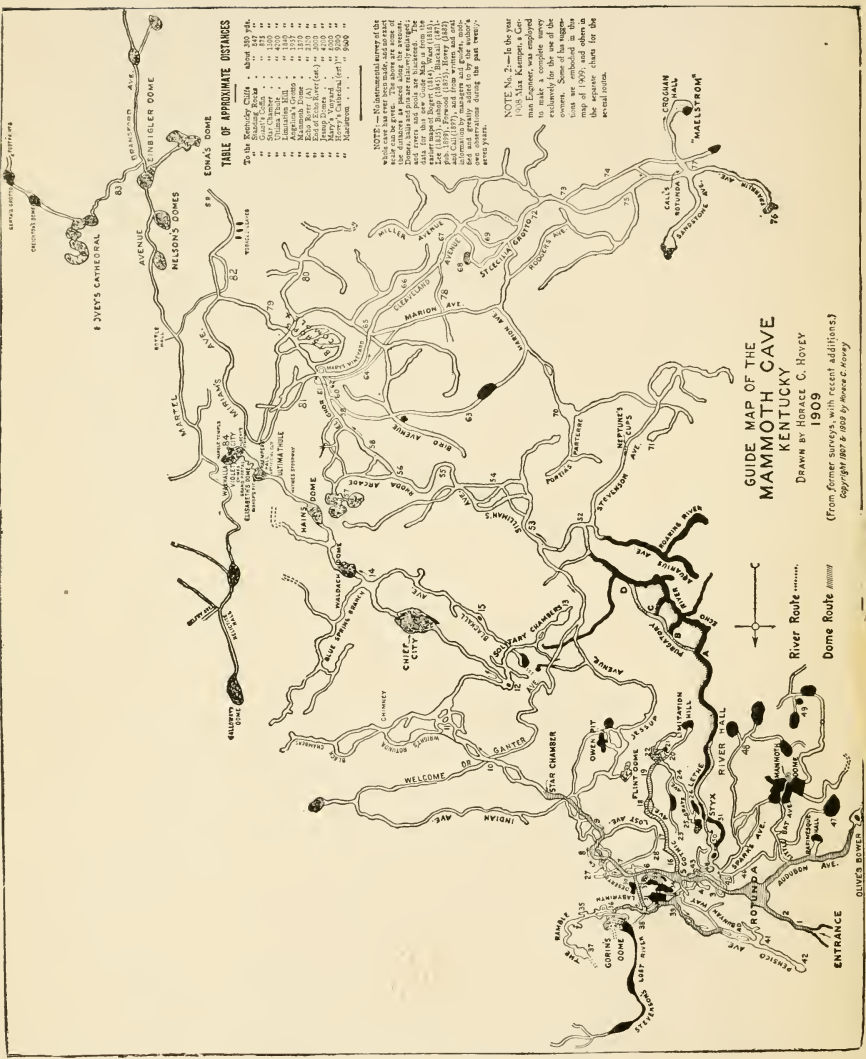


TABLE OF APPROXIMATE DISTANCES

To the Kentucky Caves	Approx. Miles
Cave City	10
Union City	15
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NOTE.—No horizontal survey of the whole cave has ever been made, and several of the distances are based upon the assumed accuracy of the surveyors. The distances are given in feet, and the feet are rounded off to the nearest foot. The distances are given in feet, and the feet are rounded off to the nearest foot. The distances are given in feet, and the feet are rounded off to the nearest foot.

NOTE No. 2.—In the year 1908 Max Kemper, a German, made a complete survey of the cave, and the distances are given in feet, and the feet are rounded off to the nearest foot. The distances are given in feet, and the feet are rounded off to the nearest foot. The distances are given in feet, and the feet are rounded off to the nearest foot.

GUIDE MAP OF THE
MAMMOTH CAVE
KENTUCKY

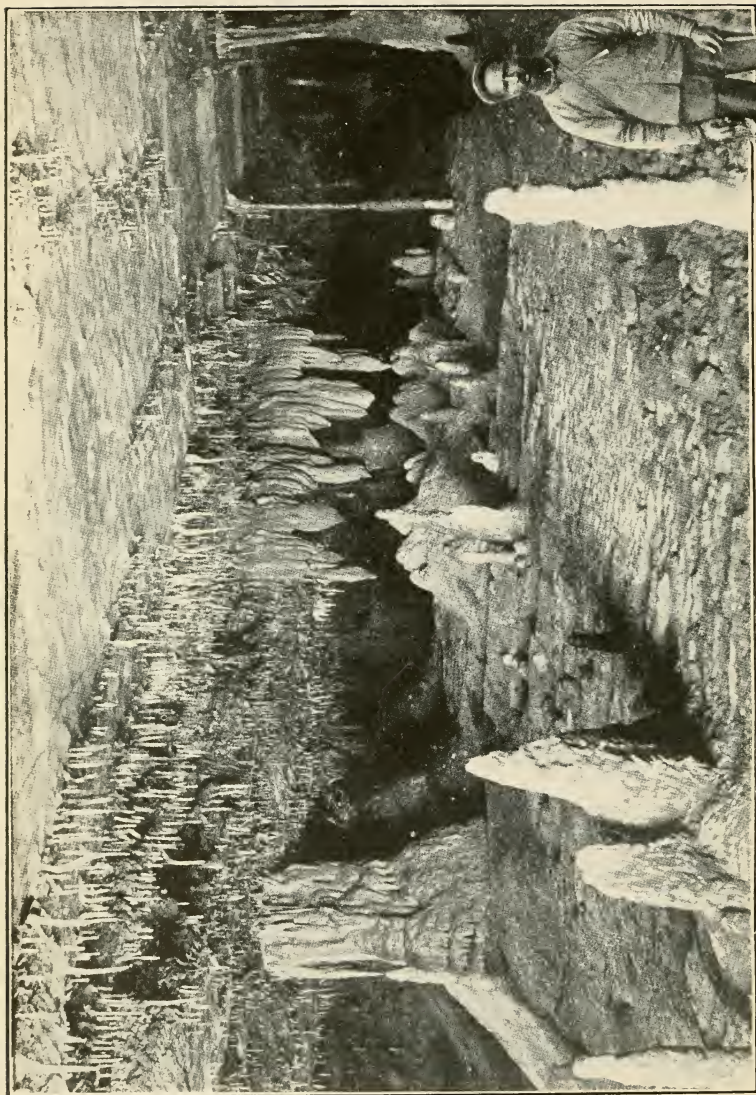
DRAWN BY HORACE C. HOVEY
1909

(From former surveys, with recent additions)
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KEY TO THE MAP

1. The Iron Gate
2. Hutchins' Narrows
3. Kentucky Cliffs and the Corkscrew
4. The Church
5. Booth's Amphitheatre
6. Standing Rocks
7. Grand Arch
8. Giant's Coffin and Dante's Gateway
9. Acute Angle and Cottages
10. Proctor's Arcade
11. Wright's Rotunda
12. The Cataracts
13. Fairy Grotto
14. St. Catherine City
15. Symmes' Pit
16. Mummy's Niche
17. Register Hall
18. The Bridal Altar
19. The Arm Chair
20. Lover's Leap
21. Elbow Crevice
22. Napoleon's Dome
23. Wilson's Way
24. Lake Purity
25. Annette Dome
26. Lee's Cisterns
27. Wooden Bowl Room
28. The Lost Way Found
29. Way to Pits and Domes
30. Side-Saddle Pit
31. Bottomless Pit
32. Covered Pit
33. Scylla
34. Charybdis
35. Putnam's Cabinet
36. Darnall's Way
37. Ariadne's Grotto
38. Short Cut from Bottomless Pit
to Gorin's Dome
39. Reveller's Hall
40. Grand Crossing
41. Pineapple Bush
42. Angelica's Grotto
43. Scotchman's Trap
44. Fat Man's Misery
45. Bandit Hall
46. Brigg's Avenue
47. Charlet's Dome
48. Wyatt's Domes
49. Balanced Rock
50. The Dead Sea
51. Charon's Cascade
- D. Janin's Landing
52. Cascade Hall
53. Serpent Hall
54. Valley-Way Side-Cut
55. The Great Western
56. Vale of Flowers
57. The Jessup Domes
58. Ole Bull's Concert Hall
59. Fly Chamber
60. Sheep Shelter
61. Corinne's Dome
62. Black Hole of Calcutta
63. Parrish's Path
64. Crypt of Jewels
65. Washington Hall
66. Snow Ball Room
67. Floral Cross
68. Orpha's Garden
69. Wisdom's Path
70. Paradise
71. Zoe's Grotto
72. Flora's Garden
73. Vale of Diamonds
74. Helen's Hall
75. Charlotte's Grotto
76. Serena's Arbor
77. Dismal Hollow
78. Clark's Avenue
79. Harlan's Avenue
80. Nicholson's Avenue
81. Boone Avenue
82. Pinson's Pass
83. Hawkins' Way
84. Violet City



"Fairy Grotto"

PREFACE



A PERSONAL WORD. I imbibed an early taste for the sciences from my father, the late Professor Edmund Otis Hovey, D. D., one of the founders of Wabash College, and a pioneer geologist in Indiana. My annual vacations, during a busy professional career spanning over fifty years, have largely been given to underground explorations.

When fifteen years old I began cave-hunting amid the charming grottoes near Madison, Indiana. An enthusiastic comrade, six years my senior, then proposed that we visit the Mammoth Cave. For certain reasons, while he went on, I got no farther at that time than Louisville; where, however, I bought, at the bookstore of Morton and Griswold, a copy of "Rambles in the Mammoth Cave, by a Visitor." It was just out. It fired my boyish imagination, and it gave shape to much of my after life.

More than four hundred books, pamphlets, scientific reports, and magazine articles have been published by different writers, besides innumerable newspaper contributions, about Kentucky's great cavern. Copies of most of these are in the author's library.

Yet there is a demand, and there seems to be room, for such a practical, condensed, and up-to-date hand-book as is now offered. It does not claim to tell all that might be told; and it omits much material that might interest the historian or the scientist. Its design is to aid the average visitor as he follows the four regulation routes by which the Cave is ordinarily exhibited.

Those who covet more abundant information as to places not often visited, or concerning the cavern fauna and flora, or as to details of local history, or as to Mammoth Cave bibliography, are referred to the larger Illustrated Manual of Mam-

moth Cave, by Hovey and Call, published by John P. Morton and Company, and for sale at the Cave. My still more comprehensive work on "Celebrated American Caverns," now out of print, may be found on the shelves of most public libraries.

The revised Guide Map (1907 and 1909) in this volume, and for sale (on a larger scale) at the Cave hotel, was made by me from an original partial survey, earlier charts being consulted, especially those by Stephen Bishop and Dr. C. R. Blackall, with a few corrections and additions suggested by Mr. Max Kaemper, to whom thanks are also due for important facts concerning his discoveries in 1908. The route-sketches found in this hand-book were redrawn from those made by him.

Acknowledgments are likewise due to my son, Dr. E. O. Hovey, of New York City; to my former comrade in cave-hunting, Dr. R. Ellsworth Call; to Benj. F. Einbigler, Norman A. Parrish, and others, for valuable correspondence and memoranda; to the late Mr. Ben Hains and Mr. H. M. Pinson, photographers; to Mr. H. C. Ganter for use of copyrighted cuts; to the officials of the Louisville and Nashville Railroad for additional illustrative material, as well as for other courtesies and favors; and particularly to the trustees, managers, and guides of Mammoth Cave for heartily and generously facilitating explorations in former and more recent years, without which this work would have been impossible.

Finally, for information as to trains via the Louisville and Nashville Railroad and connections at Glasgow Junction with the Mammoth Cave Railroad; for the arrival and departure of steamboats on Green River; for terms of Cave routes and guides, and for hotel rates by the day or the week, and for other details not within the scope of this hand-book, application may be made to the Mammoth Cave Manager, at Mammoth Cave, Kentucky. Our simple aim is to aid and entertain the reader in his subterranean rambles.

HORACE C. HOVEY.

Newburyport, Mass.

THE MAMMOTH CAVE

OF KENTUCKY



A Short Lesson in Geology and Chemistry

MANY hurry to and through and away from Mammoth Cave; but let us go in a more leisurely manner. Suppose we begin by a stroll amid the rounded hills that environ Cincinnati. We find their flanks full of corals, shells, crinoids, and other marine objects by myriads. These are fossils, yet perfect as if freshly cast up from the sea. But we observe that the limestone lies in thin, level layers, with no signs of volcanic or earthquake action. They were gently cut down by an undermining process that left no caverns, because the strata are so thin that they can not hold together. This is the same Lower Silurian formation that elsewhere made the famous "bluegrass region," causing Central Kentucky to be the fairest bit of the globe's surface known.

Go by steamboat down the Ohio to Madison, Indiana, and the scenery changes with the geology. Near the river are still seen the thin blue limestone strata that we saw at Cincinnati, but capped by the marble heights of the Upper Silurian. Cascades from the cliffs wash out the thinner, softer material, making wide, shallow grottoes, each being, as a rule, at the head of a ravine, which is a cave in ruins.

At the charming city of Louisville we encounter another geological change, and meet a striking proof that the region was once flooded by the ocean, namely, the grand old coral reef over which tumble the Falls of the Ohio. It used to bristle with branching corals like stag-horns and was strewn with tens of thousands of more delicate varieties, car-loads of which have since been carried away; but enough remain to

show that all this country was uplifted by continental forces from a primeval sea. Probably its altitude was once above the present level, to which it has been reduced by causes some of which are still at work.

Rambling through the valleys and examining their rocky beds, we find fissures no doubt caused by that continental uplifting to which we have referred. These cracks, or "joints," are visible over large areas, wherever the country rock is exposed. Usually they run at nearly right angles with one another, north and south lines crossing those from east to west. The joint-walls may closely fit, or have been parted to make channels by which falling rain might be drained.

You have noticed that soda-water roughens and eats away the marble slab on which the soda-fountain rests. On asking the reason you are told that it is due to the carbonic acid gas (carbon dioxide) with which the water is charged. In nature this same gas is formed by the decay of animal and vegetable matter. Rainwater absorbs it from the atmosphere and while sinking through the loam and soil. It also takes up humous acids, which aid in the work of corrasion effected on reaching the limestone. Mechanical energy assists chemical action in slowly dissolving and removing the limestone particles.

All limestone caves, great and small, were carved by this slow yet irresistible process. The downward flow follows the joints till a lateral "bedding-plane," or something else, turns the stream horizontally, when there results a widening of the passageway. Should the roof collapse there would be "a tumble-down" within and perhaps a "sink-hole" without. Should the cave cut through from one bedding-plane to another, a series of galleries would result; the upper ones dry as tinder and the lower ones wet with water that finally reaches the drainage level, whence it emerges into some open valley.

Occasionally the whirling water bores straight down through all galleries, making what is termed a pit, or a dome, according

to the point of view. Standing pools deposit nitrous earth and various other mineral substances. Water trickling through the roof evaporates, each drop laying down its load of the bicarbonate of lime to create a stalactite; or a stalagmite if it first falls on the floor. A general and convenient term is "dripstone," masses of which are found at almost any crossing of the joint-planes. Should "fixed air" (carbon dioxide), which is fifteen times as heavy as the atmosphere, settle into the lower parts of any cave, it would make visiting dangerous or fatal. But air currents and other causes make every part of Mammoth Cave free from any except the sweetest, purest air ever inhaled.

Approaching Mammoth Cave

According to an authentic article in the Louisville Courier-Journal for September 29, 1901, the managers of Mammoth Cave, having occasion to examine the records at Bowling Green, found that cave designated as a corner of a section of land in 1797; which antedates by some years the threadbare legend of Houchins and the wounded bear.

During the saltpeter times, 1812-1816, elsewhere described, men came and went in carts or on horseback. Seventy years ago Dr. Davidson told the Transylvania University about visiting the "Green River country," so called in honor of General Nathaniel Green, the hero of Eutaw Springs—not for its emerald tint. He hired a barouche at Henderson and traversed a dozen counties to Mammoth Cave, which Dr. John Croghan had just purchased for \$10,000, intending to "clear out the avenues and make them accessible for an omnibus to the distance of three or four miles, and erect a sort of hotel in the Temple" (the old name of the Chief City).

Charmingly did Julius Benedict, sixty years ago, narrate the adventures of Jenny Lind and her party, as they went "by the very worst road in the United States, but amid most

delightful forest scenery," from Nashville to Bowling Green, and thence to Bell's Tavern, that famous old hostelry. The rest of their journey lay along the edge of "jagged, abrupt glens, along sweeping meadows and budding woodlands," to the queer old building where "Dr. Croghan did the honors of his subterranean dominions in the most agreeable manner."

As recently as my own early visits a line of stage coaches ran from Cave City, owned by Andy McCoy and managed by Henry C. Ganter, who still entertains willing listeners at the Cave hotel by his racy stories of pioneer days. How grandly the bugle-flourish used to herald the coming stage-coach, and how everybody used to rush to greet the passengers, and how eagerly the negro servants cared for the luggage! Guests still come by carriage, on horseback, or by automobile; and many avail themselves of the steamboats plying on Green River, where a system of locks and dams has made it practicable to land within half a mile of the Cave entrance. No more delightful river-ride than this can be found in the Middle West, or more diversified by frowning cliffs, wild forests, opening amphitheatres that smile in summer with rustling fields of corn, with here and there attractive villages and flourishing cities.

But the majority avail themselves of the Louisville and Nashville Railroad, connecting with the Mammoth Cave Short-line, whose terminus is near the Cave hotel. One enjoys the comforts of modern travel while passing by a magnificent panorama of hill, valley, and undulating plain. "Knobs" several hundred feet high, capped by the Chester sandstone, above the solid St. Louis limestone, appear as cones or pyramids, whose strata remain horizontal from base to apex. Amid the Knobs run stream-swept valleys. In level regions are fertile farms, though frequently the soil is iron-stained a fiery red. One could hardly find anywhere a more charming trip by rail than from Louisville to Glasgow Junction, or one more unique than from the latter station to Mammoth Cave.



In Cave Costume

Oval depressions abound, styled "sink-holes," because through them the surface water sinks out of sight. So numerous are they that one might traverse the cave-region on horse-back all day long and not cross an open stream; all the rain-water being drained through them to underground gathering-beds, to re-appear in such cave-fed streams as Green River. The Short-line Railway from Glasgow Junction to Mammoth Cave passes a number of remarkably large sink-holes, one of the widest being "Eden Valley," covering two thousand acres, with no inlet or outlet except through pits that are conjectured to lead to the Colossal and the Mammoth caves.

On the authority of the late Professor Shaler it is said that there are four thousand sink-holes and five hundred known caverns in Edmondson County alone. In this little hand-book we can not be expected to give a list of them. In the vicinity of Mammoth Cave are several that have celebrity, and would amply reward the attention of a visitor. Among them may be mentioned Ganter, Diamond, Procter, Salt, and White caves. The last two belong to the Mammoth Cave estate, and are occasionally visited by tourists. The Salt Cave is remarkable for prehistoric relics, and the White Cave for its stalactites. Dixon Cave also is noteworthy as having probably been the original mouth of Mammoth Cave. It is an immense chamber, fifteen hundred feet long, from sixty to eighty feet wide, and from eighty to one hundred and twenty-five feet high, and was once worked for saltpeter. The Colossal Cavern, belonging to the Louisville and Nashville Railroad, is but a mile and a half distant, and is noted for its magnificence.

Thus far the woodman's axe has spared the grand old forest trees on the estate, except as needed for firewood, and many delightful rambles are to be had among them. Game used to abound, and still rewards the skillful hunter, and Green River abounds in fish.

Ownership of the Cave

Mr. McLean bought the Cave and two hundred acres around it, in 1811, for forty dollars, and soon sold it to Mr. Gatewood, who in turn sold it to Messrs. Gratz and Wilkins, who sent Mr. Archibald Miller from Philadelphia to manage saltpeter works for them during the War of 1812, at a time when an embargo cut off foreign sources of supply. The Cave estate, with sixteen hundred acres of land, passed into the hands of Mr. James Moore, a Philadelphia merchant, in 1816, and when he was ruined by the Burr and Blennerhasset fiasco, Gatewood took it again and made it a "show-cave." Mr. Frank Gorin bought the property in 1837, and made Miller and Moore his agents, with Stephen Bishop and Matt Bransford as guides. Discoveries followed so fast as to draw public attention at home and abroad.

The fame of this natural wonder reached a young physician of Louisville, Dr. John Croghan, while traveling in Europe, and on his return he became so charmed with the Cave that he bought it from Mr. Gorin for \$10,000, and also purchased two thousand acres about it, in order to control any other possible entrances than the main one. To the original miner's cabin, Mr. James Miller, his agent, added in 1835 the long row of log cabins still used by guests; since joined by wide porches and modernized by frame additions and all conveniences. Among the agents who have exhibited the Cave or run the hotel, or both, are Messrs. Archibald, James, William, and W. Scott Miller, Larkin J. Procter, Mr. Owsley, D. L. Graves, Francis Klett, W. C. Comstock, Henry C. Ganter, and L. F. Charlet.

The will of Dr. Croghan, probated February 5, 1849, left the entire Mammoth Cave estate in the hands of trustees for the benefit of his nine nephews and nieces, namely, the sons and daughters of Colonel George Croghan and General T. S. Jesup; with the proviso that, when they should all have died, the trustees should sell the estate at public auction. Unless some of the heirs should buy it, a desirable purchaser might

be the Louisville and Nashville Railroad Company; or the entire group of caverns in the vicinity might be converted into a State or national park. Meanwhile we are content that it should remain under the excellent management of the present trustees.

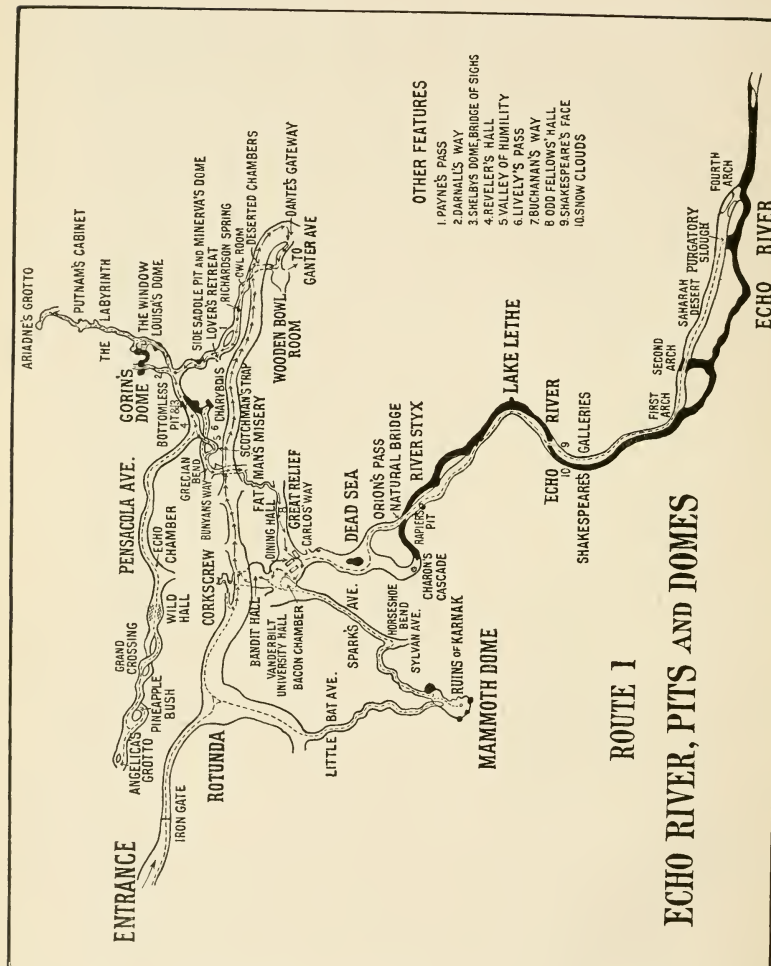
No guides are employed but those who are trustworthy. Stephen Bishop and Matt Bransford have passed away; so have Nicholas Bransford and William Garvin. Tom Lee, my first guide, and John M. Nelson, with whom I have made many an underground trip, are not now in service. Those whom one is likely to meet at present are Edward Bishop, William Bransford, Robert Lively, and Joshua Wilson, with several other capable guides at hand for emergencies. All are heroes of many adventures, and their strong arms have rescued many a visitor from disaster. Their word is law, and no one is allowed to enter without a guide. Hence accidents are of rare occurrence.

The fact so widely heralded that, in the spring of 1909, a party of "Shriners" got lost in the Cave for eight hours, was wholly due to their refusing to obey the guides, and breaking away from their comrades under the voluntary and unauthorized leadership of one of their own number. As soon as possible guides were dispatched to their rescue, who brought them safely out to the open air.

For the convenience of visitors, as well as with reasonable consideration for the guides themselves, certain hours and routes are fixed, from which it is not customary to depart, unless by special arrangement with the management. Four routes are mapped out, the uniform charge for each being two dollars. For terms for the season, or for large parties, etc., as well as for information as to hotel rates, and indeed for anything special, visitors should apply to the Mammoth Cave manager. Cave suits are to let, and proper methods of illumination are provided by the guides. Even a few hours of wandering below ground will be worth while; but those who can remain amid these wonderful scenes for a longer period will be amply repaid by incessantly varying sights and experiences.



"Martha Washington's Statue"



ROUTE I

Echo River, Pits and Domes

A pathway from the Hotel winds through the garden, down amid the forest, crossing a wagon road to Green River, and then brings us to the only known entrance to Mammoth Cave. Evidently it is where the roof broke down long ago; for the lower valley was doubtless once part of the cavern, and so was what is now known as Dixon Cave. The present Cave mouth is seven hundred and thirty-five feet above sea level, one hundred and ninety-four feet above the level of Green River, and one hundred and eighteen feet below the crest of the overhanging bluff. The limestone stratum is three hundred and twenty-eight feet thick, measuring from the sandstone above to the drainage level below; and within these limits all the vast labyrinth extends its ramifications.

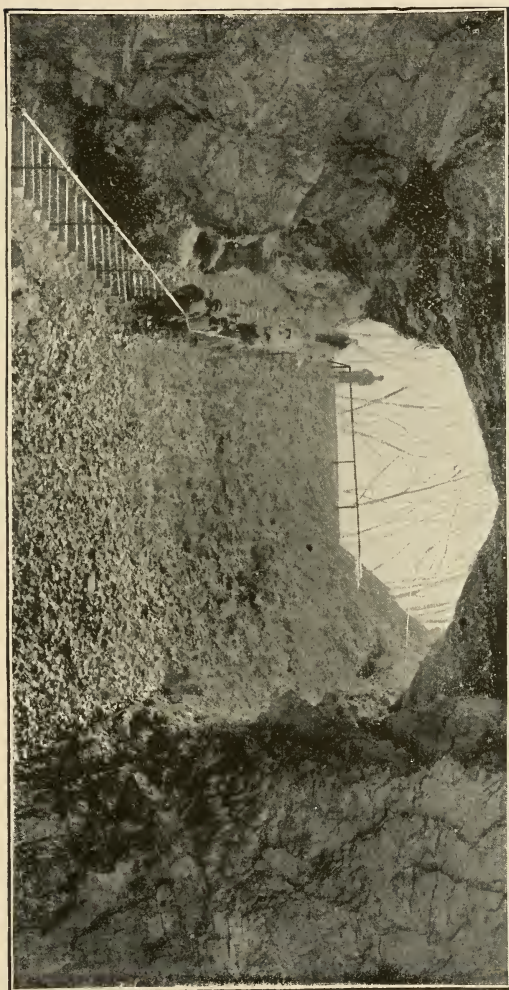
One of the first things noticed by the visitor is the strong current of cool air that flows from the Cave mouth, frequently too strong to allow the carrying of lighted lamps until a point is reached many yards within, where the gale dies away. As we descend the solid stone stairway we observe with pleasure a waterfall that leaps from the ledge, gleams in the sunlight, and vanishes amid the rocks on the floor. Around us hang festoons of vines and ferns, and before us is the noble vestibule to a temple of eternal night.

An iron gate is unlocked for us, put there to prevent unpaid intrusion and vandal spoliation. Passing through, we bid farewell to daylight, and depend on the simple iron lamps given to each of us by the guide. The legend that a hunter named Houchins, in 1809, chased a wounded bear into this throat of the cave, whether authentic or not, is perpetuated in the name given it, Houchins' Narrows, made still narrower

by the blocks of limestone piled in walls on either side, thus leaving a passage only a few feet wide. To the left is the tomb of two Indians found in early days and reburied here. No monument marks the grave of these nameless aborigines. Considering the fact that the Cave was resorted to by many generations of red men, it is remarkable that so few human remains have rewarded diligent search.

What are these wooden pipes along the floor? They were laid there by the saltpeter miners to convey the water from the cascade at the entrance down to the leaching vats that are now pointed out to us in the Rotunda. The ruts of old ox-carts are visible in which the "peter-dirt" was carried to the vats from the open avenues, while sacks were used for those more remote. The solution was pumped out to open-air boilers, run through ash-hoppers, cooled in crystallization troughs, and packed for transportation to the seaboard, mostly by mules. Thus did patriotic Kentucky supply the government with one of the ingredients of gunpowder, at a time when foreign sources were cut off. The yield of nitrate was four pounds to the bushel of soil, and the vast heaps of lixiviated earth seem to warrant the boast that Mammoth Cave alone "could supply the whole population of the globe with saltpeter."

The lofty arch of the Rotunda is directly under the Hotel; and it would be possible, by means of a shaft, to supply every room with the sweetest and purest air, transforming it into a "lime-air" sanitarium, as has actually been done in some other localities. By a series of temperature observations with verified thermometers, the writer has proved that the uniform temperature of the Cave is 54° Fahr., winter and summer; and the air is chemically and optically pure. Lighted by magnesium fire the grandeur of this first of many halls is made visible, as are also the openings of two broad avenues, one of them being the Main Cave and the other the entrance to Audubon Avenue and Little Bat



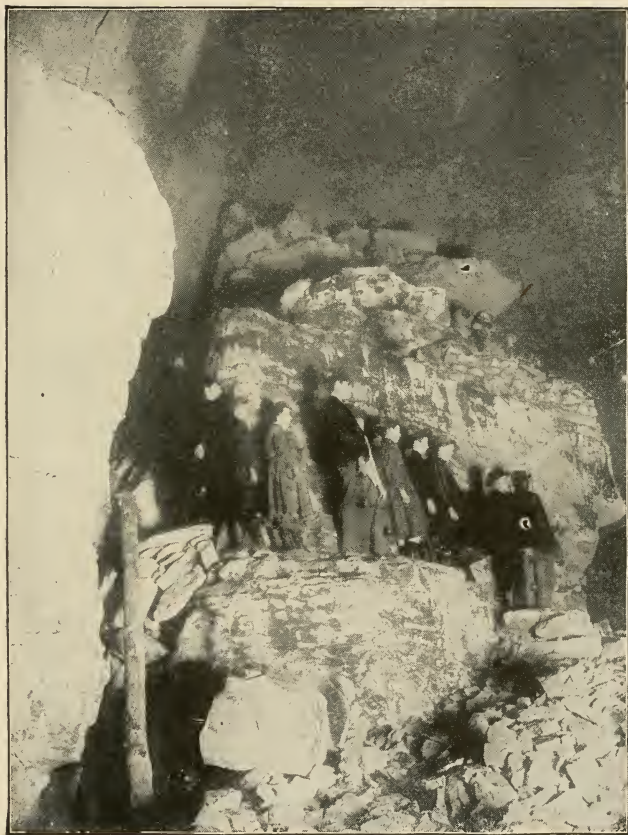
Entrance to Mammoth Cave

Avenue. Here in winter assemble myriads of bats from all the region around, clustering in nooks and crevices for their long sleep of hibernation.

Leaving Audubon Avenue to be described in Route II, we enter from it, at a point some five hundred feet from the Rotunda, and by a low arch, the winding way known as Little Bat Avenue, chiefly remarkable as leading to the Crevice Pit, which is immediately over the Ruins of Karnak. The story is told by the late Dr. R. M. Bird that a former owner, Mr. Wilkins, let a lamp down the pit by a rope that caught fire, with the loss of the lamp. A reward of two dollars was offered for its recovery. A little darkey agreed to be let down, as a sort of living plummet, to sound the depth of the chasm. He told such a tale as to the magnificent temple underneath, with its tall columns and splendid adornments, that nobody believed him. Thirty years later the lost lamp was found by old Matt, the guide, who gave it to me.

The Main Cave, or Grand Gallery, or as we like to style it the "Broadway" of this subterranean metropolis, extends from the Rotunda to the Cataracts, and must be traversed to reach any other part of the cavern. In this first route only about eight hundred yards of it are shown.

High overhead springs an arch eighty feet wide and resting on vertical walls. Presently the guide calls our attention to the exit of the Corkscrew, on our left, an extraordinary passageway by which we are to return after visiting the River Hall. If we happen here as another party is returning, a curious effect is produced by their torches emerging one at a time in a procession winding down the Kentucky Cliffs. But now we advance along the worn cart-road made by the saltpeter miners, strewn by their ancient log-conduits, which are strangely preserved during the century that has elapsed since some of them were first brought hither. Lift one and you will be astonished to find how light they are. At the junction of the Main Cave



Leaving the "Corkscrew"

and Archibald Avenue is the "Church," where the pious miners used to hear the message of salvation taught by itinerant preachers, and where in more recent days many a sermon has been preached and many a psalm been sung, awakening echoes from the cavern walls.

Reserving the Gothic Avenue for another visit, we note, as we pass along, the grotesque figures of animals and birds made by the deposits of the black oxide of manganese overhead. Mark well the Standing Rocks, which fell edge-downward ages ago, set free from the roof possibly by some earthquake shock. Now we walk awe-struck under the Grand Arch, where the guides effect a marvelous surprise by means of simple illumination. They burn chemical fires at a point near the saltpeter vats, some five hundred feet to the rear of us, and the contour of the walls brings out a statuesque effect which is aptly styled "Martha Washington's Statue." It requires but little play of the imagination to fancy it a marble representation of that eminent lady of Colonial times.

An immense rock lies near the right-hand wall, forty-five feet long, eighteen feet wide, and fifteen feet high, which used to be called the Steamboat; but it is now known as the Giant's Coffin. The quasi-sarcophagus may have been torn from the adjacent wall by some convulsion, or it may simply have fallen and lodged in its present suggestive position. Its weight is estimated at two thousand tons. It is one of the great landmarks, and though we should pass it many times it is impossible to do so without being impressed by its solitary grandeur, rivaling as it does the blocks of Baalbec in Syria.

The route now taken leads us behind the Giant's Coffin, through a low and narrow passage which would never have been discovered had not the monster rock fallen. This is styled Dante's Gateway, from which a rude stairway leads us into the Wooden Bowl Room, so named either from its peculiar shape or because an Indian wooden bowl was found

there. To the left is the opening to what has variously been styled Indian Avenue, Blacksnake Avenue, and Welcome Avenue. Really it is a combination of several avenues, running for the distance of eight thousand five hundred feet, as measured by the writer, which have been made passable by the skill and industry of Mr. H. C. Ganter when he was manager of the Cave, and which for this reason is generally called Ganter Avenue. Its inner end is at Serpent Hall, and it gives an exit for any one who may get caught beyond the rivers by a sudden rise of water.

Our present path goes through the "Dog-Hole," down a stairway fancifully called "The Steeps of Time," leading into the region of pits and domes. We pause a while by Richardson's Spring, which is a small pool filled by a running stream that has worn for itself a narrow channel in the rock, illustrating what has been done for the entire Cave on a grander scale. Small crustaceans are found in this clear pool, and blind insects abound under the flat rocks near by. Numberless blind crickets leap away from us, and white eyeless spiders, brown beetles, thousand-legged worms, and other abnormal forms of life are found by careful search. Nothing harmful, however, appears, either here or elsewhere. As a rule cave-life is timid.

Side-saddle Pit, fifty feet deep, was named from its imagined resemblance to a lady's saddle. Above it rises Minerva's Dome, thirty feet high. The spot used to be dangerous, but is now guarded by a stout railing. Once a terrier leaped down the chasm after a fire-ball flung by a guide. The guide's wife allowed herself to be lowered by a rope and rescued the poor dog, which did not seem to be seriously hurt by his perilous adventure. Calypso's Avenue, to the left, leads to the Covered Pit and Scylla and Charybdis, which are rarely visited.

Near the entrance to the Labyrinth is a window through which we behold the wonderful and lofty chamber discovered

by a former owner of the Cave, Mr. Frank Gorin, in whose honor it is named Gorin's Dome. Perhaps the earliest account of it was that published by Dr. Davidson. Its height, as measured by myself with the aid of a cluster of small balloons, is one hundred and sixty feet, its width is thirty-five feet and its length sixty feet. Its vertical walls sweep in an S-shaped curve and spring from the river level to the apex of the dome, with projecting bosses of coral and with cascades that awake the echoes as they fall.

Darnall's Way was cut through the sandbank, in 1896, to the summit, where a bridge cast directly across the abyss gives us the most complete view to be had of the locality. One remarkable feature is a folded alabaster curtain one hundred and nineteen feet high. By casting fire-balls down the whole interior is grandly illuminated. Davidson descended to the bottom, as others have occasionally done since, by means of a well some thirty feet deep, down which one clammers like a chimney-sweep. He found there "stretching away in midnight blackness a horrid pool of water." In 1863 Mr. F. J. Stevenson, of London, had a boat made and lowered through the window, on which he floated away for seven long hours on a perilous voyage that no man has since then repeated. The water now setting back from Green River has closed the entrance to what we term "Stevenson's Lost River"; but his old boat still lies where it was stranded at the bottom of Gorin's Dome.

Another huge abyss, the Bottomless Pit, was long regarded as ending further progress, till Stephen Bishop crossed it in 1840 by means of a slender cedar sapling thrown over the yawning gulf; since when it has been spanned by a substantial and safe bridge. Instead of being "bottomless" it is exactly one hundred and five feet deep. Above it is Shelby's Dome, named for the first Governor of Kentucky. Balls of cotton waste saturated with coal-oil are flung down by the guides,



“Bottomless Pit”

which grandly display the wrinkled and corrugated walls of the pit. Looking directly across, we see an opening through which the writer and William Garvin emerged from their explorations around Scylla and Charybdis. There are other ways of approach, one from Gorin's Dome, another from near the Scotchman's Trap, and still another from River Hall to the very bottom, from which the upward view almost equals that from the base of Gorin's Dome. All this great group of pits is connected below to form an immense hall, about four hundred feet long, which at high water is flooded by the overflow from River Hall. By special permission of former President of the United States Benjamin Harrison, this vast room was named Harrison Hall.

On crossing the Bridge of Sighs we find an enlargement of the Cave formerly used as a dining place, and hence known as Reveller's Hall. Pensico Avenue, along which we go, is crossed underneath by an invisible passageway, causing sounds to be reproduced in Echo Chamber with marvelous reverberations. Wending our way amid the huge rocks that encumber Wild Hall we next reach the Grand Crossing, and beyond it the singular dry stalactite, the Pineapple Bush, and end our path in Angelica's Grotto, with its curious Hanging Grove.

Retracing our steps to Reveller's Hall, we descend by an opening overhung by an enormous slab so poised as to make it seem as if a careless breath might make it fall. This is the Scotchman's Trap, so named for a canny Scot who refused to go farther lest he should be entrapped. But we dive under and go on, coming presently to the Fat Man's Misery. This is a serpentine passage, its walls changing direction eight times in two hundred and thirty-six feet, its width but eighteen inches and its height in places only five feet. It is indeed enough to try a fat man's soul and body. The sides are marked by ripples and waves, and are polished by the friction of many vexed visitors.

The fattest man that ever went through weighed two hundred and eighty-two pounds at the start, but avers that he lost twenty pounds in the process. Another, a jovial son of Erin, stuck fast and was left to his fate. Later he turned up all right and explained matters in his own way. He said that he remembered every sin he had ever committed; and when he called to mind how, at a certain recent hotly contested election, he voted the wrong ticket by mistake, it made him feel so small that he got free from the Fat Man's Misery quite easily.

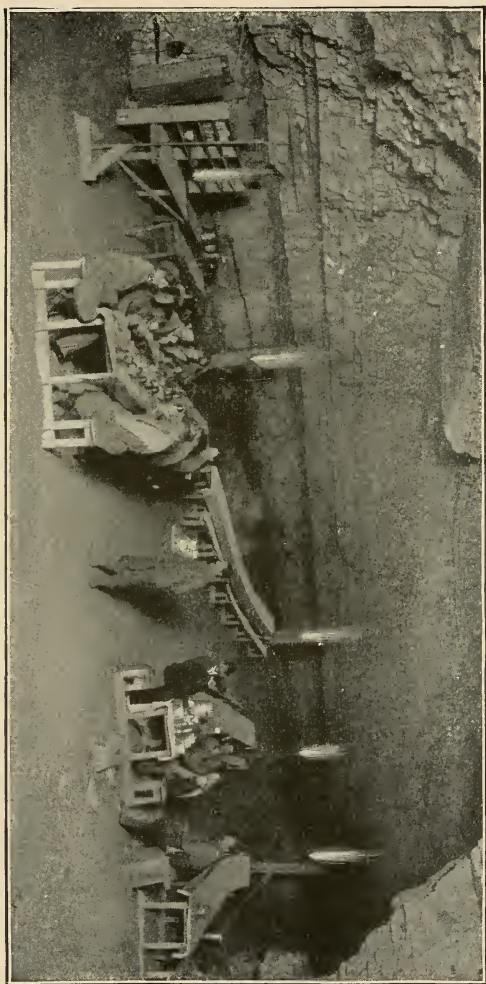
The room into which we emerge is fitly styled "Great Relief"; and from it we enter the Bacon Chamber, where Nature in a frolicsome mood has carved the limestone into masses resembling rows of hams and shoulders in a packing-house. Near by is the Dining Hall, where, on occasion, well-filled tables are spread.

A special trip can be made through Spark's Avenue, entered from Bandit Hall, and leading on to the Mammoth Dome. We first visited it in 1878, and were assured that no one had been there for seven years. A treacherous old ladder was then the only means of descending to the floor, which sloped away to a pool whose waters received a cascade falling from the lofty apex. The ladder has been replaced by a substantial stairway, by crossing which we reach the Egyptian Temple, or the Ruins of Karnak. Six columns eighty feet high and twenty-five feet in diameter stand in a semicircle, each deeply fluted, veneered by yellow stalagmite and covered by mimic tracery. Overhead is the black opening already mentioned as the Crevice Pit; and underneath are extensive catacombs rarely visited. Dr. Call's measurement of the extreme height, from the cascade pool to the summit of the dome above the Crevice Pit, was one hundred and fifty feet; which was later confirmed by my balloon system of measurement. The total length of the room is not far from four hundred feet.

River Hall, to which we now return, might be said to extend for miles, were we to include all the known branches of subterranean waters. So unlike is it to the Main Cave that we might almost be said to have entered another cavern—which would really be true. What is called in a general way Mammoth Cave is a congeries of different caves, whose walls and floors were first thinned and then broken through by the agency of water, until was formed the immense and greatly diversified labyrinth whose mazes we are exploring. Here is the gathering-bed of hundreds of sink-holes opening from the surface. The exit is in deep, bubbling pools along Green River, of which the Upper and Lower Big Springs are examples. And when Green River is flooded by freshets its waters back through such secret channels and also flood River Hall by a body of water from thirty to one hundred feet in depth and fully two miles long, with capricious currents and perilous whirlpools. Navigation at such times is forbidden; but at low water it is entirely safe, under the care of our skillful guides.

Sullen waters reposing at the foot of a cliff sixty feet high are called the Dead Sea, though not bitter but sweet, as those may find who venture down to the margin. An iron railing guards the way as we descend to a lower terrace. Presently, on the right, we see a cascade, that falls into a funnel-shaped hollow and vanishes. Near by, in 1881, the writer found a natural mushroom bed, that suggested the idea of a mushroom farm, but with meager results because located in Audubon Avenue, where irrigation is impracticable.

The black waters of the River Styx wind between steep walls for some four hundred feet, and with an average breadth of forty feet. Formerly it was passed over by boat, but now by a natural bridge protected by a guard-rail. Lake Lethe is next in order, along whose border we go cautiously, in hope of seeing specimens of the famous eyeless fish (*Amblyopsis speleus*) that abound in these waters. They seldom exceed



Banquet Hall in Mammoth Cave

three or four inches in length, are colorless, have cartilage instead of bones, are viviparous, and are so sensitive to approach that they dart away if a grain of sand falls on the water. The blind white crawfish (*Cambarus pellucidus*) is often seen. These creatures were first described by Dr. Davidson, two years previous to their being mentioned by DeKay, who was credited by Agassiz as their discoverer.

The Great Walk for four hundred yards used to be admired, but now its beautiful yellow sand is covered by the back-water from the rivers. The roof here is mottled like snow-clouds. Midway the mask of Shakespeare is pointed out, and other objects of interest are visible. Stephen Bishop, John Craig, and Brice Patton first crossed these rivers, over which thousands have since safely voyaged. A fleet of flat-boats awaits us, the material for which was brought in by way of the Crevice Pit. Each boat has seats for some twenty persons, while the guide propels the primitive craft by his paddle.

Four arches open to the Echo River, only the fourth being ordinarily available. To reach this we cross the Sandy Sahara and flounder through the Slough of Purgatory. The voyage abounds in most enjoyable adventures, though care must be taken not to upset amid waters that have no shores except at the landing-places. A few years ago a party, mainly of journalists, managed to swamp their boat, but were rescued by the presence of mind of all concerned, particularly the strong-armed and faithful guide, John M. Nelson, whose orders they obeyed.

Echo River varies in width from twenty to two hundred feet, under an archway averaging thirty feet in height, the depth varying from five to twenty-five feet, and its level being only about twenty feet above that of Green River. The portion over which visitors are taken is perhaps half a mile or more long. All along its margin, where the rock abruptly meets the water, are countless cavities that have been washed out

On Echo River



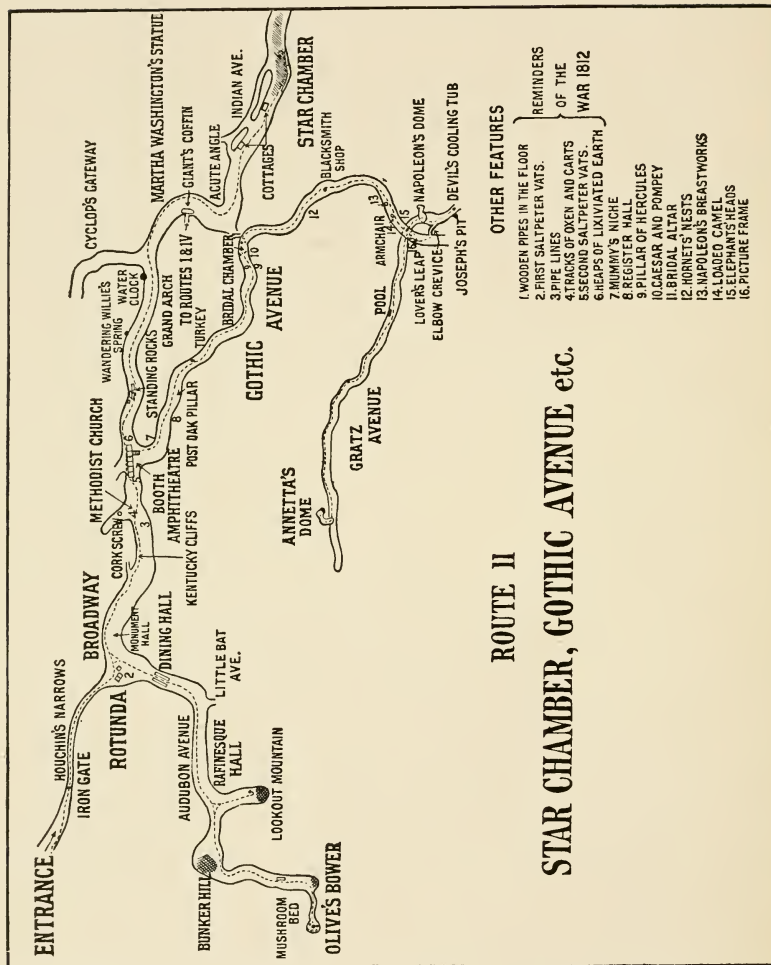
by the stream. These gave a wag in our party on first crossing the river his chance, and he cried, "Oh, see these little bits of caves, three for five cents!" Then awoke the echoes and carried the sound away and away till he was ashamed of himself. Then a lady in black velvet Cave costume, with tiny bells along the fringe to keep her from getting lost, sang the "Sweet Bye and Bye." A revolver was fired, answered by a "Rebel Yell." Flute and cornet were played with magical effect.

The term "echo" misleads; for what is given is really a wonderful prolongation of sound, lasting five, ten, or even twenty minutes. The tunnel's own key-note when struck excites harmonics of depth and sweetness, along with a profound undertone. When the guide agitates the water a myriad tiny silver bells tinkle, followed by heavier ones as the waves strike the cavities along the walls. This tempest of harmony dies away with strange mutterings, as if of an angry mob. Mr. Ganter tells of a time when the writer fooled him by causing unearthly shrieks, as of wretches in mortal agony, at an hour when none were on the river but themselves.

Here ends the First Route. We retrace our steps as far as Bandit Hall, where some one raises the question if there is no way out but by Fat Man's Misery. The guide answers, "Yes, by the Corkscrew," adding the warning, "Those who come in by the Fat Man's Misery go out by the Corkscrew, and those who come in by the Corkscrew go out by the Fat Man's Misery: and whichever way they take, they wish they had taken the other." So, up we scramble like so many rats, under or over great ledges, leaping from rock to rock, or climbing ladders, through what seems like an enormous pit that had been filled in with gigantic rocks, till at last, breathless, we emerge upon the Kentucky Cliffs in the Main Cave. A few steps carry us past the saltpeter vats, through the Rotunda, and the iron gate is unlocked to let us into the vestibule, whence we climb the stone stairs to daylight.



“Bridal Altar”



ROUTE II

Olive's Bower, Star Chamber, and Gothic Avenue

After a suitable period of rest and refreshment at the Hotel we resume our way along the same path taken for the first route, but presently deviate to explore Audubon Avenue, of which we had only seen the beginning. It is related that when the great ornithologist visited Rafinesque, the former smashed a fine violin in his eagerness to capture a unique specimen of the bat family. As a kind of amicable revenge the latter affixed Audubon's name to this avenue, where so many myriads of bats annually hibernate. It is fitting that the great branch to the left, sweeping for three hundred and fifty feet and suddenly ending in a tumble-down, should be named Rafinesque Hall. Unless our visit is in late fall or winter, we find but few clusters of bats; but in cold weather they gather here from near and far and hang head-downward till somehow, by a sense not explained, they know it is warm weather out-of-doors, and then fly forth to the forests. Dr. Call boasts of a single catch that gave him six hundred and seventy bats, of many varieties, most of which were sent to the National Museum.

Advancing through Audubon Avenue, we soon find the roof and floor approaching to form what is called Bunker Hill, around which we pass by a narrow defile. The Mushroom Beds attract our attention, to which we have already referred as having cost far more than they ever returned by way of profit, although the idea itself is feasible.

Above a floor encumbered by debris hang formations needing an explanation. Limpid drops trickle through the roof, saturated with bicarbonate of lime. The supply of water is constant, but so meager as to drip instead of flow; and as the dripping goes on each drop lays down its load as a ring

slight enough for a fairy's finger. Ring follows ring till a pendant is formed like a pipestem. The pipestems thicken to the size of candles, and often grow as large as tree-trunks. Occasionally they broaden into elegant drapery, or are twisted into fantastic shapes. All these stone icicles are called "stalactites."

Such lime-laden drops as fall splash about and on evaporation deposit, not rings, but films thin as tissue-paper, building up stalagmites that are solid from their base upwards. Often these downward and upward growths meet as stately shafts, like the pillar named the Sentinel, which guards Olive's Bower a few steps beyond it.

The general term "dripstone" is conveniently applied to all these deposits, and their finer varieties are known to the mineralogist as "oriental alabaster." A central stalactite in Olive's Bower is very large and cone-shaped, amid many smaller ones. Below is a rampart, looking over which we see, some twenty feet below, a limpid pool that reflects the overhanging formations. Before leaving the subject of dripstone it should be remarked that, chemically regarded, it is simply the hard carbonate, not the bicarbonate, as is often alleged; the latter being an unstable compound, readily changing on any change of its conditions.

The pit which arrests our progress beyond Olive's Bower might, if explored, prove this locality to be connected with White's Cave, whose features it resembles. On returning to the Rotunda we again inspect the historic relics of the War of 1812, and mark the grooves cut in the limestone walls by the hubs of the primitive cart-wheels that were slowly drawn along by oxen to collect the nitrous earth for the saltpeter vats. We notice that the bottoms of these vats were made of small logs halved and grooved and laid in layers on supports; the lower layer with its grooved surface up, to receive the second layer in reversed position, making a method for conveying the lye into reservoirs, whence it was pumped out to the crys-

tallization troughs. Dr. Call was the first to direct attention to this ingenious device.

Again we forsake the Main Cave for a ramble through Gothic Avenue, which is reached by a stairway just beyond the vats. At the entrance to it is Booth's Amphitheatre, where Edwin Booth is said to have recited a part of the play of Hamlet. In early times a mummy was found in an adjoining cave, and brought hither for exhibition. The alcove where it reposed still bears the name of the Mummy's Niche. It was afterward carried about through the West on exhibition, and it was the writer's privilege to see it at that time. It was naturally dessicated, and with its ornaments and garments was regarded as a great curiosity. It remained in a museum at Worcester, Mass., for many years, and is now in the National Museum at Washington, D. C.

Hundreds of visitors have recorded their names in Register Hall, either by scratching them on the wall with the knife or smoking them there by their candles, or else by the less conspicuous way of depositing their cards on the ledge set apart for that purpose. Here, and also in parts of the Main Cave, so-called "monuments" are built by piling up flat fragments of stone in honor of individuals, States, or benevolent organizations; a practice which incidentally has helped to clear obstructions from the pathway in which we walk. The largest of them all is quite properly the Kentucky Monument. The effect in general, however, is to divert attention from the natural attractions.

The hoary old stalactites, great and small, in Gothic Avenue got their growth ages ago. The signs show that long ago the Cave stream was diverted to lower channels, leaving the place as dry as a tinder-box. The Post-Oak Pillar, the Pillars of Hercules, Pompey and Cæsar, and the Altar in Gothic Chapel, are interesting and picturesque, and give the guides occasion for many legends and jokes; but do not warrant the con-

clusions drawn by Dr. Binkerd and others as to the age of the Mammoth Cave, judging by the alleged slow growth of dripstone in a locality where there is now no growth at all. There is no doubt as to the vast antiquity of the great cavern, whose remote origin is by many referred to the Tertiary Period; but it must be remembered that geological changes are by no means uniform, and that catastrophe has evidently played a conspicuous part in cave-making.

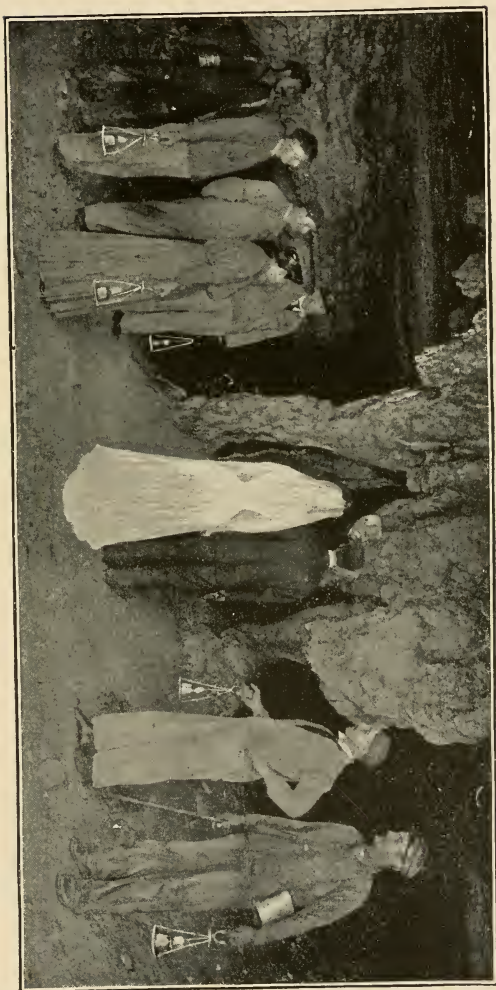
There is not enough moisture now in Gothic Avenue to make the atoms float in the air. Toss a handful of dust up, and it falls back like so much shot. I saw a party of young people who came here directly from the ballroom, and not a particle of dust spotted the trailing robes or clung to the polished boots. Wood here undergoes tardy decay, and fresh beef and other meats keep sweet for a long time, and then dry up like the old mummy which was mentioned as having once been placed here.

Pompey's Pillar is named for a negro miner, a raw hand, who in old times trudged in here alone for "peter-dirt" and lost his way. He stumbled, put out his lamp, and was in a frenzy. When at last he saw his half-naked negro comrades approach, swinging their torches and shouting, he took them for demons, and shouted lustily for mercy. It took no little shaking and punching to convince him that he was yet alive and in Mammoth Cave, instead of elsewhere.

It may tax the imagination to find the resemblance to an Elephant's Head in the stalactite so called; but once found the grotesque likeness is vivid.

A curious legend told of the Gothic Chapel and its Bridal Altar is verified. A Kentucky belle gave her heart to a gallant Southron. But her mother, who opposed the match, made her swear never to marry any man on the face of the earth. Shortly the lovers eloped and were hotly pursued; but before they were caught they were married in this novel Gretna Green. Taxed with her broken pledge, the bride replied:

Marriage in "Gothic Chapel"



"Mother, dear, it was not marrying any man 'on the face of the earth' to wed my own true love in this underground chapel."

Few ladies fail to rest awhile in the Old Arm Chair, a stalagmite naturally fitted as a seat. Jenny Lind sat here and sang one of her sweet songs; and many a song has been sung here since. A slender projection beyond it is called the Lover's Leap, from whose point an illumination shows a wild mass of rocks amid which runs a narrow path styled the Elbow Crevice, whose walls are fantastically folded. We escape from the ragged edge of what is known as Joseph's Pit, and note in passing the Devil's Cooling Tub. Gatewood's Dining-Table is a huge flat rock directly under Napoleon's Dome, from whose apex it fell.

Gratz Avenue, into which we enter, is not on the same Cave level as the Gothic Avenue. Unless we take care we may walk directly into the exquisitely clear waters of Lake Purity, a small mirror-like pool. Beyond it we go, winding to and fro, till at the foot of a small cliff we find the entrance to Annette's Dome, one of the prettiest in all the Cave. Shaler's Brook spouts from the wall and runs merrily and musically into a smaller room, whence it vanishes, falling by a leap of seventy feet into Lee's Cistern. In Gratz Avenue are found blind crustaceans, crickets, and other forms of life described by Dr. Call.

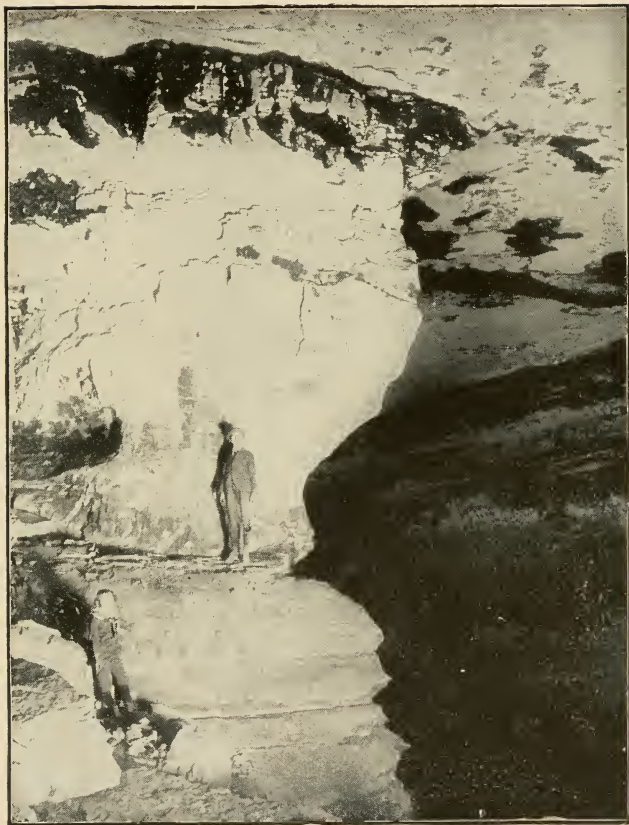
We now retrace our way to the Main Cave, passing various objects noticed in the first route. Shortly beyond the Giant's Coffin the Main Cave turns suddenly to the left at the Acute Angle, where the burning magnesium makes visible the vast dimensions of the cavern by illuminating it in two directions at once. A village in the vicinity formerly sheltered a colony of consumptives who, in 1843, and by medical advice, took up their abode here, hopeful for relief or cure because of the uniform temperature and the naturally oxygenated air. The sunless days passed slowly by till the pitiful experiment was abandoned as a failure, as was also the experiment by the invalids to make trees and shrubbery grow around their dismal huts. Some of the victims of the "white plague" lie buried



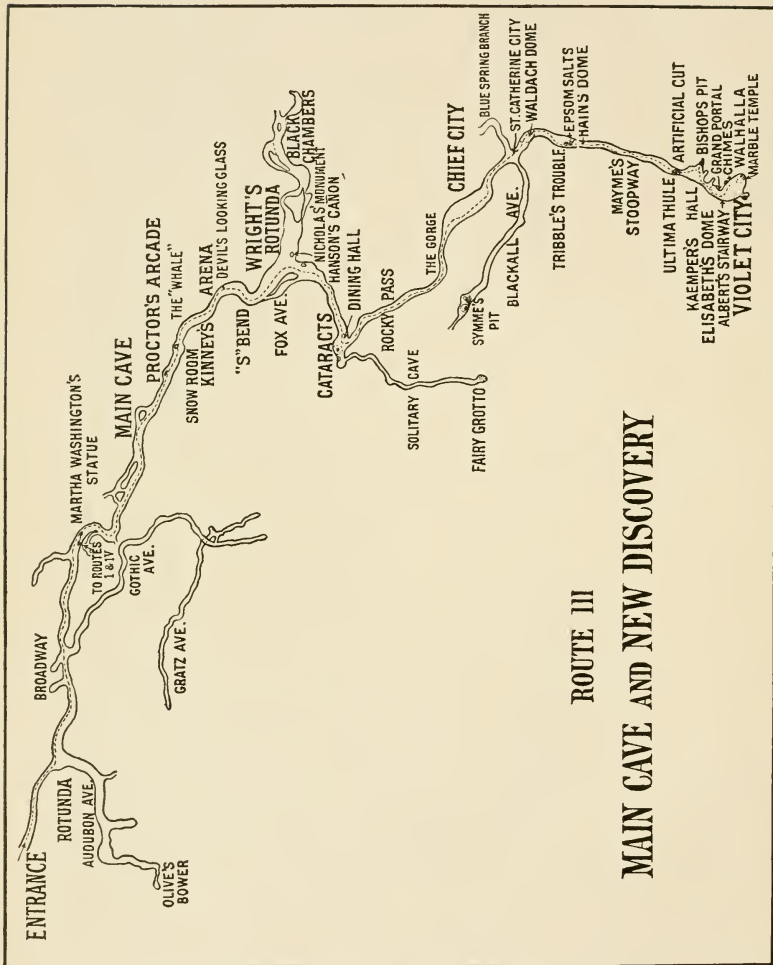
“Old Arm Chair”

in the grove back of the Hotel garden, while others died soon after returning to their homes. There were originally thirteen cottages and tents, the only ones now remaining being two roofless stone structures beyond the Acute Angle.

A strangely beautiful transformation scene is wrought for us in the Star Chamber, a hall seventy feet wide, sixty feet high, and several hundred feet long. The ceiling is coated with manganese dioxide, and through this black background emerge hundreds of brilliant white stars, made by the efflorescence of the sulphate of magnesia. These are invisible at first, and the magnificent archway sweeps above us in midnight blackness. Long benches are ranged against the right-hand wall, on which the guide seats us, while he collects our lamps and vanishes with them behind a jutting rock. Then comes the marvelous illusion. The roof seems lifted to an immense height. Indeed, we seem to gaze from a cañon directly up to the starry sky. Cloud-shadows are thrown athwart it by adroit manipulation. A meteor shoots across the vault. We behold the mild glory of the Milky Way. Suddenly the guide breaks in upon our exclamations of delight by saying, "Good night. I will see you again in the morning!" He plunges into a gorge. We are in utter darkness. The silence is so perfect that we can hear our hearts beat. Presently a glimmer comes from another direction, like a faint streak of dawn. The aurora tinges the tips of the rocks; the horizon is bathed in a rosy glow; a concert of cock-crowing, the lowing of cattle and other barnyard sounds, answered by the barking of the house-dog, seem to herald the rising sun; when the ventriloquial guide appears, swinging his cluster of lamps and asking how we liked the performance. Our response is a hearty encore; after granting which the guide tells us that the second route ends here, and he must pilot us back to the mouth of the Cave and to the Hotel. Those who have witnessed the wonders of the Star Chamber many times testify that the charm never wanes.



"The Acute Angle"



ROUTE III

From the Star Chamber to Violet City

Familiar now with the features of the first part of the Main Cave, we trudge along rapidly, till the guide cries "Halt!" We seem to hear the measured ticking of an old-fashioned clock. We find the natural timepiece to be but the dripping of water into a small basin hidden behind some rocks. The drops fall only a few inches, one by one, as they may have fallen for a thousand years; but such are the acoustic properties of the place that their musical ticking is heard for a long distance. The guide shows us also another pretty pool, made by a tiny rill gushing from the solid wall; and he tells us the story of a rambling blind boy, who won a living by his violin, and who said that he "wanted to *see* the Cave" for himself. Somehow he got apart from his companions, and when they found the little boy he was sound asleep beside this tiny basin, which has ever since been known as "Wandering Willie's Spring."

Hastening on to the Star Chamber, we resume our exploration of the Main Cave. Beyond that hall of constellations, the Grand Gallery—as it used to be called—sweeps to the right, and the starry canopy changes to a "mackerel-sky," caused by the scaling-off of the black deposit on the ceiling, thus exposing the white limestone. This is the Floating Cloud Room. As we look aloft at the fleecy masses that seem to float along, we notice a stout oak pole jutting from an inaccessible crevice. When, why, how, and by whom was it put there? In Lee's "Notes of the Mammoth Cave," in 1835, ancient fireplaces are mentioned, which were also shown to myself by old Matt, in 1881, and which were hidden by broad slabs along the margin of the Cave.

Curious objects are pointed out as we walk through Procter's Arcade and Kinney's Arena, lofty and symmetrical enlargements of the passageway. One of them is another stout pole in a rift in the roof. The Keel-Boat (or the Whale) is an enormous rock seventy feet long, and a tilted slab of limestone is the Devil's Looking-Glass. Presently it begins to snow; and our shouts make the flakes fall faster. Waving lamps and lighted fire-balls augment the storm. Seeking an explanation, we find that the ceiling is crusted with native Epsom salts, whose crystals are thus dislodged, as well as more silently by the growth of new crystals, falling as saline snow till the brown ledges are whitened by mimic snowdrifts.

No stooping or crawling has to be done in the Main Cave, and the floor is everywhere dry. Formerly the tilting slabs of limestone made walking difficult, but now these are removed so as to give us a fairly smooth road throughout. The serpentine winding known as the S-bend expands to a width of one hundred and seventy-five feet and keeps that width for five hundred and fifty feet; but midway it meets a grand crossing, that increases the width to about four hundred feet. Fox Avenue, near by, encloses a large cave-island.

Dr. Nahum Ward and other early explorers fancied the Main Cave as formerly an underground Nile, and its rocky masses ruined cities; and on the first maps they were numbered First, Second, Third, Fourth, and Fifth City. The first in order was called the Chief City, while the fourth, now familiar to us by that name, was the Temple. This fact explains some conflicting accounts by early and more recent authors. Robert M. Bird was responsible for these changes, giving the name of Wright's Rotunda to the First City in honor of his friend, Prof. C. A. Wright, M. D.

This is one of the most spacious rooms in the Cave, being shaped like the letter T, its length about five hundred feet and its width at the transept about three hundred and fifty

feet. The ceiling is quite level throughout, but the floor is irregular, causing the space between roof and floor to vary from ten to forty-five feet. When several chemical fires are ignited at distant points simultaneously the effect is superb. Ragged cliffs divide this prodigious area, making a sort of great island, beyond which by climbing through the so-called Chimneys those who wish can reach the Black Chambers above, extending for several hundred feet. The walls and domes of these chambers are coated with the black oxide of manganese, and the enormous rocks lie scattered in the wildest disorder.

Returning to Wright's Rotunda and taking the other arm of the T, we presently find ourselves looking directly into a steep hollow, or pit, into which the Cataracts tumble from orifices in the roof, and with resounding force after a rainfall. Those who risk a descent part way down the pit and climb over a wall may find their way into the Solitary Chambers and the Fairy Grotto, though the difficulty of access prevents these places from being ordinarily exhibited. A "tumble-down" to the left of the Cataract chasm might correctly be regarded as the termination of the Main Cave.

A passage to the left opens from Cataract Hall to a lofty avenue commonly spoken of as a continuation of the Main Cave, but really on another level. The limestone slabs that used to clatter under our feet and endanger our equilibrium have been made firm or else removed, and we easily proceed through the Gorge and across the portal of what once was styled the Temple, but has long been known as the Chief City.

By my measurement the room is four hundred and fifty feet long, with an average width of one hundred and seventy-five feet; but others have made the dimensions larger. The utmost height does not exceed one hundred and twenty-five feet. The maximum width, as measured by Dr. Call, is two hundred and eighty-seven feet. The area covers about two

acres. And over this vast space springs a solid and seamless canopy of gray limestone, that has thus lifted its majestic arch for thousands of years. Dr. Bird found here, in 1837, aboriginal relics "in astonishing, unaccountable quantities." Formerly these were heaped as bonfires to illuminate the chamber; but even yet cartloads remain of half-burnt cane-torches, fragments of woven moccasins, and other objects of interest, to reward search amid crevices and crannies. The theory is that the Indians made this place their council chamber, or else their stronghold of refuge from enemies.

Fascinated with the local attractions and possibly too forgetful of the weariness of my guide, I lingered once till midnight, prowling amid the fastnesses of the Chief City. Noticing presently the utter silence that prevailed, I returned to where my guide had been left on guard, only to find a couple of lamps and a strip of brown paper on which he had scrawled the words, "It is midnight and I got tired and went out." The guide had really deserted me, and the only thing to do was to await the coming of comrades, who would surely hunt me up, as they did after the lapse of an hour or so. Extinguishing the lamps meanwhile, fancy was given full play to people the mysterious council chamber with ghosts of dusky warriors, till there seemed to be a rush of whispers and other imaginary sounds that were really caused, I suppose, by the coursing of the blood through my veins. It was easy to realize that a person actually lost in Mammoth Cave might soon be so bewildered as to lose his reason. Even in my own case it was a relief to break the spell, as I did, by simply striking a match and trimming anew the flickering flame of my lamps. Every observant visitor has seen with pleasure the assemblage of rocks and the overarching canopy aglow with Bengal lights or burning magnesium, and has commented on the singular fact that the lofty dome seems to follow him as he retires from its protection.

St. Catherine City, which lies beyond, is at the intersection of the Blue Spring Branch and Blackall Avenue with the main passageway. The latter, recently named in honor of the veteran cave-hunter, Dr. C. R. Blackall, of Philadelphia, ends in a funnel-shaped pit bearing the name of Symmes' Pit, probably in memory of Captain John Cleves Symmes, of Newport, Kentucky, whose theory gained much attention formerly—that our globe was a hollow sphere with an opening at the poles, and that within were races of men and animals different from those on the surface. At a public meeting held at Frankfort, a resolution was adopted to the effect that the United States Congress should fit out an expedition to the Arctic Circle under his command, in order to find, if possible, the mysterious Polar pit for which this Cave pit was named.

Our course, however, leads us to Waldach's Dome (in memory of Charles Waldach, the pioneer in cave-photography) and Hains' Dome (in honor of his successor, Ben Hains), both of them symmetrical and noble domes, rising to oval ceilings above smooth floors of sand. In the Garret we find flakes of Epsom salts like those found in the Snow Room. Bending low through Mayme's Stoopway, we reach what to Dr. Call and myself seemed to be an impenetrable wall, to which we gave what we thought the fitting name of "Ultima Thule."

In the year 1908 Mr. Max Kaemper, of Germany, undertook a complete exploration of Mammoth Cave, assisted by Edward Bishop, guide, the results of which are exclusively for the owners of the Cave. Their observations led them to suspect that a certain tumble-down in the Sandstone Avenue might be identical with the tumble-down known as Ultima Thule. Hence they attacked a crawl-way near the latter, and by patiently removing many limestone fragments they wormed their way through to an oval hall, one hundred and sixty feet long by one hundred and twenty feet wide and sixty feet high,

now named, for its discoverer, Kaemper Hall. An unseen waterfall, by whose music they had been led onward, was now seen to dash down an abyss they named, for the guide, Bishop's Pit. Another is the "Parrish Pit," so called for Norman A. Parrish, of Buffalo, New York. These are the first of a series of eleven pits, the others not yet being named.

Fifty steps to the right is a short passage where an iron gate is now fixed, opening into a symmetrical chamber seventy-five feet in diameter and of about the same height, rising by vaulted arches and closing above in a beautiful circle. This is Elizabeth's Dome, named for a sister of Mr. Kaemper. The exit is by the Grand Portal, an arch sixty feet wide and fifty feet high, commanding one of the most magnificent views in all the underground world.

On visiting the locality soon after its discovery, I seated myself on Albert's Stairway, while one of my companions ignited Bengal lights here and there, and the other used an automobile searchlight brought in for the purpose; and thus they gave me my first view of the wonderful region, to which the general name of Violet City is given, in honor of Mrs. Violet Blair Janin, the wife of Trustee Albert C. Janin, and the fair owner of one third of the Mammoth Cave estate. Special features are Blair Castle and the Marble Temple, whose environs are styled "Walhalla," for the fabled realm above the clouds where dwell the heroes and demigods of old German mythology.

Picking up our torches again, and carrying my acetylene bicycle lamp, to which I had fixed a convenient handle, we followed a natural pathway near the wall on the left, that led us from place to place. We found that Violet City is two hundred and fifty feet long by one hundred and twenty-five wide, rivaled only in size by Wright's Rotunda and the Chief City, and greatly exceeding them in beauty. A sandstone cave-in at the end seems to lend color to the idea that Sand-

"The Chimes"



stone Avenue, or some similar place, is near. These fallen blocks are cemented together by a profusion of onyx.

Stalactites and stalagmites abound everywhere, varying in color from the purest white alabaster through every imaginable shade. The upper central part of the hall is crowned by three masses of fluted white onyx, glistening with exquisite crystals, while from the roof hang in fine array stalactites eight or ten feet long. The right wall is decorated with pure white formations, and the left wall is coated with rich brown onyx. A row of stalactites of varying length emit musical tones when struck by the knuckles, and by skillful percussion simple airs can be played on them. These are the Chimes.

Other attractions excite surprise. The Beer Mug, like a mug of foaming ale, the Ripe Tomato, a rare bit of red onyx, and other odd specimens of natural mimicry are here. One familiar with the brilliant creations found in the wonderful caverns of Luray might easily imagine himself in that Virginian fairyland instead of in Mammoth Cave. Thus far these marvelous treasures have been kept untouched by vandal fingers, such as have robbed or destroyed elsewhere what should have been most jealously guarded in the greatest cavern known.

In his zeal to open a passage from Violet City to Sandstone Avenue Mr. Kaemper obtained permission to use explosives. Thus he made considerable progress. However, the indications were that he was likely to burst through to the surface somewhere, instead of into Sandstone Avenue, and accordingly he desisted. In either case the result might have been advantageous. An opening into Sandstone Avenue would enable visitors to make the circuit through the Main Cave and Violet City, and return by the Long Route, without having to retrace their steps. On the other hand, an exit to the surface from near Violet City would enable them to return by coach to the Cave Hotel without a wearisome tramp over ground already trodden.

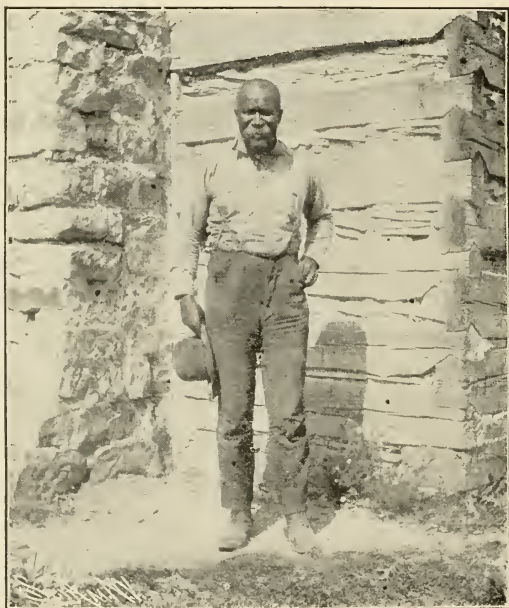
To convince those who, like the writer, are skeptical as to the proximity of Violet City and Sandstone Avenue, Kaemper



“The Marble Temple”

and Bishop repaired, one to the first place and the other to the second, agreeing on a fixed moment by the watch when they would fire revolvers and likewise hammer on the rocks. The pistol shots were inaudible, but the blows on the walls were faintly heard. By similar sound-tests it was determined that Wright's Rotunda is directly above the Serpent Hall (beyond Echo River), so that it might be possible to connect them by a stairway through an artificial shaft. Incidentally I may state, however, as showing how far sound may travel through the rocks and their mysterious crevices, that, while in the Chief City, we heard the steam-cars running over the Mammoth Cave Railroad.

But now no short cut is provided for us, and we return as we came, carrying with us delightful memories of the New Discovery.



William Garvin, the Guide

In "Violet City"



ROUTE IV

To the Maelström and Hovey's Cathedral

Let no one in ordinary vigor forego the remarkable scenes of what is frequently known as "The Long Route," simply because longer than either of the other three. The trip is varied by the boat-ride, the midday lunch, and the occasional stops at points of interest. The spirits are also sustained by the exhilarating Cave atmosphere.

We may imagine ourselves, therefore, as having landed at Rocky Inlet, on the farther shore of the wonderful Echo River. Soon we are greeted by the music of the waterfall in Cascade Hall. To our right are Stephenson's Avenue, whose principal attraction is Neptune's Cups, and the Aquarius Avenue, leading to Roaring River; both of which offer matters of interest to the scientist, but are never visited by ordinary tourists, who hasten on to other scenes more accessible. Wellington's Galleries are peculiar shelf-like projections. At Dripping Spring we find a few stalactites. We pass in safety what the guides irreverently name the Infernal Regions, Pluto's Dome, and Old Scratch Hall—the latter being surprisingly scratched all over, while the only trails of serpents in Serpent Hall are the freaks of nature observed as winding channels overhead. The fact should be noted that this is high-water mark for Echo River in time of flood. Hence we take particular interest in the opening from Serpent Hall to Ganter Avenue as our only exit at such times, running as it does for eight thousand five hundred feet to the Wooden Bowl Room, near the Giant's Coffin in the Main Cave. We are assured, however, that visitors are seldom so unlucky as to get caught by such a sudden rise of the waters. We have now entered Silliman's Avenue, named for the late Professor Silliman of Yale University. In

the Valley-Way Side-Cut are singular crystals of gypsum that grow in the ground, whence they are dug up, like so many potatoes. Beyond the Hill of Fatigue stands the Great Western, resembling an ocean steamer, her helm hard-a-port. By mounting a ledge between the Vale of Flowers and Rabbit Rock, and following Rhoda Arcade for about five hundred yards amid interesting incrustations, we find three domes, named for different members of the Jesup family, the highest and most symmetrical being Lucy's Dome, connected by a lofty archway with the other two. Immense alabaster curtains hang on the walls, and the effect when illuminated from the archway is grand.

On the left of Silliman's Avenue is a hall with fine acoustic properties, thirty feet wide, forty long, and twenty high, where the famous Norwegian violinist Ole Bull is said to have once given a special performance; and hence it bears his name, Ole Bull's Concert Hall. The wild and rugged pass which, on the map, seems to be a continuance of Silliman's Avenue, is really on a lower level, and is well named "El Ghor" (The Gorge). It winds about like a forsaken river bed, which it undoubtedly is, and offers many surprising sights. One such is the Fly Chamber, in which swarms of house-flies seem to have settled on the walls and ceiling. Examination proves them to be so many crystals of black oxide of manganese. The Hanging Rocks, the Sheep-shelter, and the Victoria Crown are formations whose names suggest their shape. Immediately over El Ghor is Corinne's Dome, nine feet wide and about forty feet high. The guide points out what he styles Suicide Rock, and when you innocently ask him "Why?" his ready reply is, "Because it hung itself." The Black Hole of Calcutta is an ugly black pit on the left of the pass. El Ghor continues on for some distance, but we leave it after refreshing ourselves at Hebe's Spring, a clear pool four feet in diameter by a foot and a half deep, and said to be impregnated with sulphur;

a fact of interest—it might easily come from the reduction of gypsum or Epsom salt.

Stevenson, who was here in 1861, says, "There is a short avenue, or rather a hole, leading from El Ghor to a sheet of water called Mystic River, which has not been explored, as they have never been able to get a boat in there." Other early writers mention Mystic River, but Dr. Call and myself were unable to find it. Possibly it is identical with the stream in Martel Avenue; but no one would ever think of a "boat" in connection with the latter.

Boone Avenue, diverging from El Ghor to our left at a point five thousand eight hundred and twenty yards from the mouth of the Cave, was for many years blocked by a stone stairway, recently removed. Important discoveries were made in this direction in 1907, to which we shall presently give attention.

Now, however, we climb up through an uninviting hole at our right that admits us to an upper tier of caverns. When the last man is through we burn blue fire, and are surprised to find ourselves in a stone vineyard. Nodules and globules simulate clusters on clusters of luscious grapes, gleaming with parti-colored tints through dripping dew. No covetous hand is allowed to pluck the marvelous vintage of Mary's Vineyard; which, after all, the mineralogist explains as simply calcium carbonate coated with the black oxide of iron.

Washington Hall, smoke-stained and its floor strewn with relics of hundreds of lunch-parties in former days, is mainly interesting as the place whence two grand avenues diverge, namely, Marion Avenue, not included in our route, and Cleveland Avenue, so named for the late mineralogist of that name. This avenue is one of the great "lions" of Mammoth Cave, and many think more of it than of all the other Cave lions put together. It has indeed a marvelous beauty peculiarly its own. Walls and ceiling everywhere are decorated by mimic leaves and flowers, in an infinite variety of form. There is

hardly a plant known to botany that does not find its counterpart here; but roses, camellias, and chrysanthemums are the most common varieties. In many parts of this treasury of crystals there is not a space as large as your hand that is not decorated by dazzling blossoms; and even the floor sparkles with bright fragments of flowers demolished by vandal visitors. Dr. John Locke, of Cincinnati, gave these Cave rosettes the name of "oulopholites," meaning literally "curled-leaf-stones." Among descriptive names assigned to different parts of this enchanted realm are Snowball Room, Flora's Garden, Orpha's Garden, the Cross of Flowers, the Last Rose of Summer, Crypt of Jewels, and Charlotte's Grotto. These are not all of them in Cleaveland Avenue, but some are in its vicinity. It is a vast crystalline region, through which one may wander for fully two miles and occasionally find, in some secluded nook, the trailing vines, stalks of celery, and stag's antlers described by early tourists.

Surfeited at length by such floral splendors, we suddenly emerge into Call's Rotunda and clamber up the loosely piled blocks of limestone called the Rocky Mountains, from whose summit we look down into the Dismal Hollow, whose gloom our red fires hardly succeed in dispelling. Three avenues branch from Call's Rotunda; one to Sandstone Avenue, which Kaemper considers to be in proximity to Violet City; another, Franklin Avenue, ends in Serena's Arbor; and the third leads directly to a large room named, for the former owner of the Cave, Croghan's Hall. It is sixty feet in diameter and thirty feet high. Here we find the yawning chasm known as the Maelström, which by my measurement is eighty-eight feet deep, though often described as far deeper than that. It is claimed that W. C. Prentice was the first to descend to the bottom of this abyss. According to Mr. Procter the same feat was afterward accomplished by Mr. Richard Babbitt. Mr. F. J. Stevenson, of London, in his letters to his mother, tells the story at great length of his own descent into the

Maelström in the presence of thirty witnesses and with the help of two guides, Nicholas Branford and Frank de Monbrun. On the 15th of May, 1905, Mr. Benjamin F. Einbigler and John M. Nelson, guide, were lowered by ropes held by Edward Hawkins and Levi Woodson, guides, the rope-length being exactly ninety-seven feet eight inches. Their account differs materially from the former descriptions, but we will not try to adjust their statements in this manual. The most that the visitor will be apt to do will be to peer over the brink and wonder that anybody should venture down such an awful abyss. This is estimated to be ninety-six hundred yards from the entrance to the Cave, and is often spoken of as "the end of Mammoth Cave." But who can tell where the real "end" of so vast a labyrinth may be? At any rate here we turn and retrace our steps through the paradise of Cave flowers until we reach Mary's Vineyard and descend to the level of El Ghor.

Here, if we have the time, strength, and inclination, we may enter Boone Avenue, which has been known for many years, and visit what is practically a new part of the Cave, though there are signs of its having been explored long ago by unknown visitors.

A well-worn path leads us to a chasm, down whose slope we pick our way to a lower level known on Stephen Bishop's old map as Miriam Avenue. A narrow and winding way, called Pinson's Pass, leads into a long and noble avenue which is named Martel Avenue, in honor of the famous cave-hunter of France, Edward A. Martel. The point where we enter it is called, from its peculiar shape, Bottle Hall. Were we to go to the left in Martel Avenue we should find the path rugged and difficult, but would be rewarded by seeing Helictite Hall, where abound those curious twisted and distorted stalactites known as helictites. Several small passages branch off from the avenue, which finally terminates in Galloway's Dome.

The right-hand portion of Martel Avenue brings us soon to the bed of a brook that must at times be deeply covered

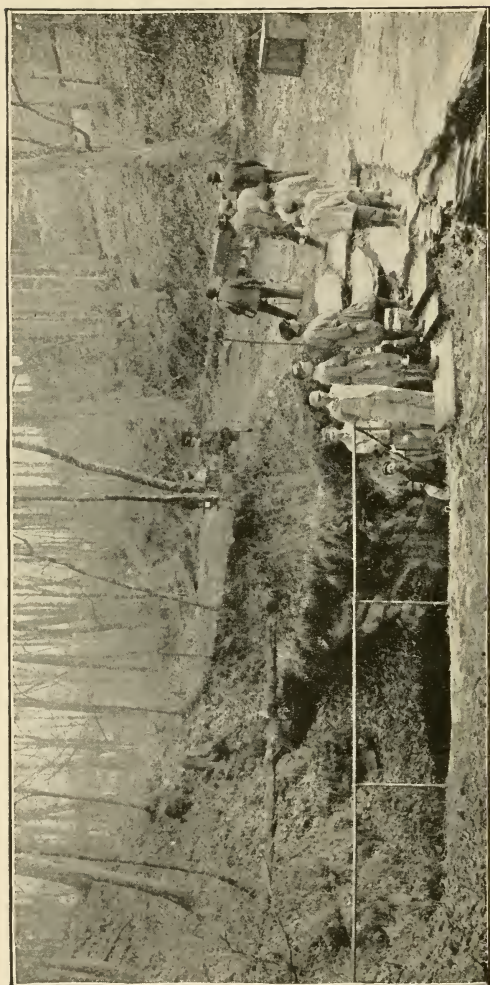
by flowing water. Ripple marks of sand alternate with flat masses of jet-black polished flint. Knots of wood, roots of corn-stalks, and other objects indicate that they were recently swept down hither from the surface. Two adjacent domes are named for the intrepid guide, John M. Nelson, but beyond them some hardy pioneer had inscribed on a rock the date 1848. Mr. Norman A. Parrish came as far as this in 1904, but the distinction of availing himself of footholds over a risky limestone slip and crossing where others had turned back belongs to Mr. B. F. Einbigler, already mentioned as having descended the Maelström. For him the great overhanging dome is named, while a still grander one about a hundred yards beyond was named by him "Edna Dome" for his sister, who subsequently visited it. Instead of narrowing to an apex, as most domes do, Edna Dome broadens at the top, seeming to open into a cross-cavern. This conjecture remains to be verified by some climber.

Edward Hawkins scaled the wall of the pit underneath Einbigler's Dome, May 15, 1907, being followed by Einbigler, Bransford, and at another visit by Mr. H. M. Pinson, who took along the head-light of an automobile for illumination. This searchlight was still there on the occasion of my own visit, on the 18th of June, 1907, a month afterward, in company with William Bransford and Frank Barry, guides. Passing through Hawkins' Way and scaling a wall at its end, we were on the level floor of a dome sixty feet in diameter and from one hundred and fifty to two hundred feet high. A tall arched gateway opened from this into a second dome of equal size; and through similar gateways we entered in succession five vast domes arranged as a sigmoidal group. From the fifth a window opens into an irregular room, where a downfall of rocks blocks further progress. In this fifth dome also a waterfall leaps from the apex to the floor, where it vanishes into a chasm. The majestic walls rise in horizontal tiers, each tier about ten feet in thickness and fringed by beautiful stalactites.

The mighty masonry ascends in narrowing circles till the powerful searchlight barely enables us to discern the oval white tablet forming the apex, girt by onyx pendants. Vertically the walls are richly corrugated from top to bottom. The entire series of five united domes is four times the magnitude of Gorin's Dome. Ages on ages were needed for the chemical and mechanical action whereby this surprising cathedral was carved in silence broken only by the wild, pattering waterfall or the heavier cataract. Let me anew express my obligation to the Mammoth Cave management for having marked their appreciation of my long-continued and enthusiastic interest in their wonderful cavern by naming, with the approval of the discoverer and the guides, this remarkable group of domes "Hovey's Cathedral."

A glance at the map will show that Kaemper and Bishop went beyond what has just been described, and found two domes, to one of which Mr. Kaemper gave the name of a German lady, calling it "Gerta's Grotto," and the other he named "Creighton's Dome," for an early and otherwise unknown explorer, whose footprints were found there, and who left his name carved on the rocks.

In conclusion, let it again be stated that the aim of this handbook is mainly to help the visitor to understand those routes over which guides ordinarily conduct parties. The known avenues and minor passageways, if placed end to end, would exceed one hundred and fifty miles by a conservative estimate. Sixty-nine pits and thirty-nine domes, counting only those of great magnitude, are known and located on the survey of 1908, besides many lateral enlargements, after the style of Wright's Rotunda and the Chief City. Yet we dare not say that this immense cavern has been completely explored. Those most familiar with its surprising dimensions think it possible that resolute men, beginning where others have left off, might find as much more new territory as has already been described in the vast subterranean realm known as the Mammoth Cave of Kentucky.



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